



THE IRP PROCESS: BEST PRACTICES

MEMPHIS LIGHT, GAS & WATER POWER SUPPLY ADVISORY TEAM

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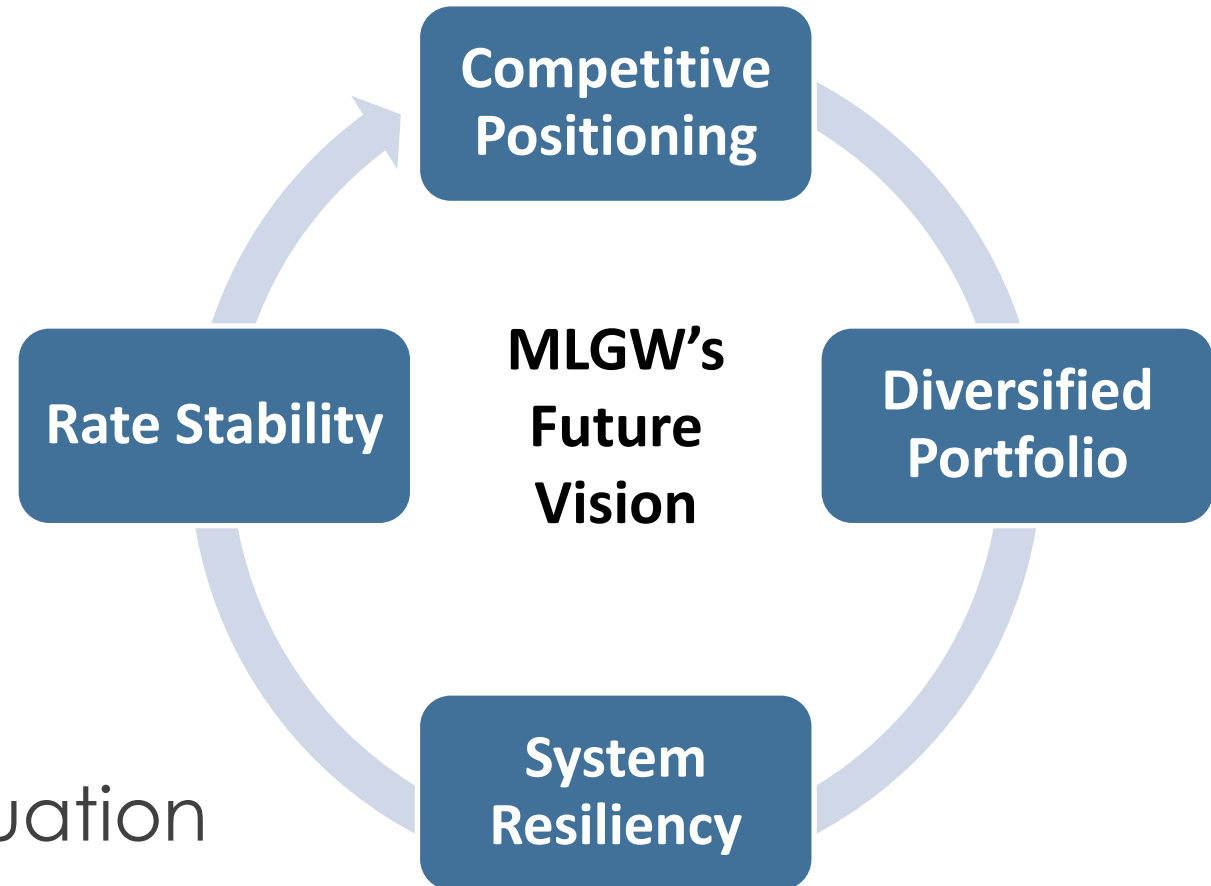


INTEGRATED RESOURCE PLANS

- ❑ Integrated Resource Plans (IRPs) are effective road maps
 - Identifies future deficiencies and potential resource
 - Identifies types of resource deficiencies
 - Provides guidance on criteria for future decisions
 - Provide transparency and clear communication to all stakeholders about process and goals
- ❑ Well-defined goals lead to well-defined power supply strategies
 - Renewable Portfolio
 - Ownership vs. Purchased Power
 - Fuel Diversity

RESOURCE PLANNING OBJECTIVES

- ❑ Generation ownership
- ❑ Add more renewables
- ❑ Local generation/reliability
- ❑ Short term / Long term PPA's
- ❑ Targeted market exposure
- ❑ Diversify energy supply
- ❑ Retail rates and competitive situation



GENERAL IRP SCOPE

- ❑ Load Forecast (20+yr)
 - Including sensitivities on economic and weather data
- ❑ Evaluate DSM / EE alternatives
- ❑ Review existing power supply resources
- ❑ Assess power supply alternatives
 - PPA opportunities, market alternatives, upgrades/retrofits, decommissioning, excess power, traditional thermal generation alternatives (solely or jointly owned), and renewables

RESOURCE SCREENING

- ❑ Economic feasibility
- ❑ Locational value
- ❑ Portfolio diversification
- ❑ Emissions regulations
- ❑ Ownership vs. PPA
- ❑ Renewables vs. traditional resources
- ❑ Transmission interconnection
- ❑ Fuel transportation / availability
- ❑ Financing implications



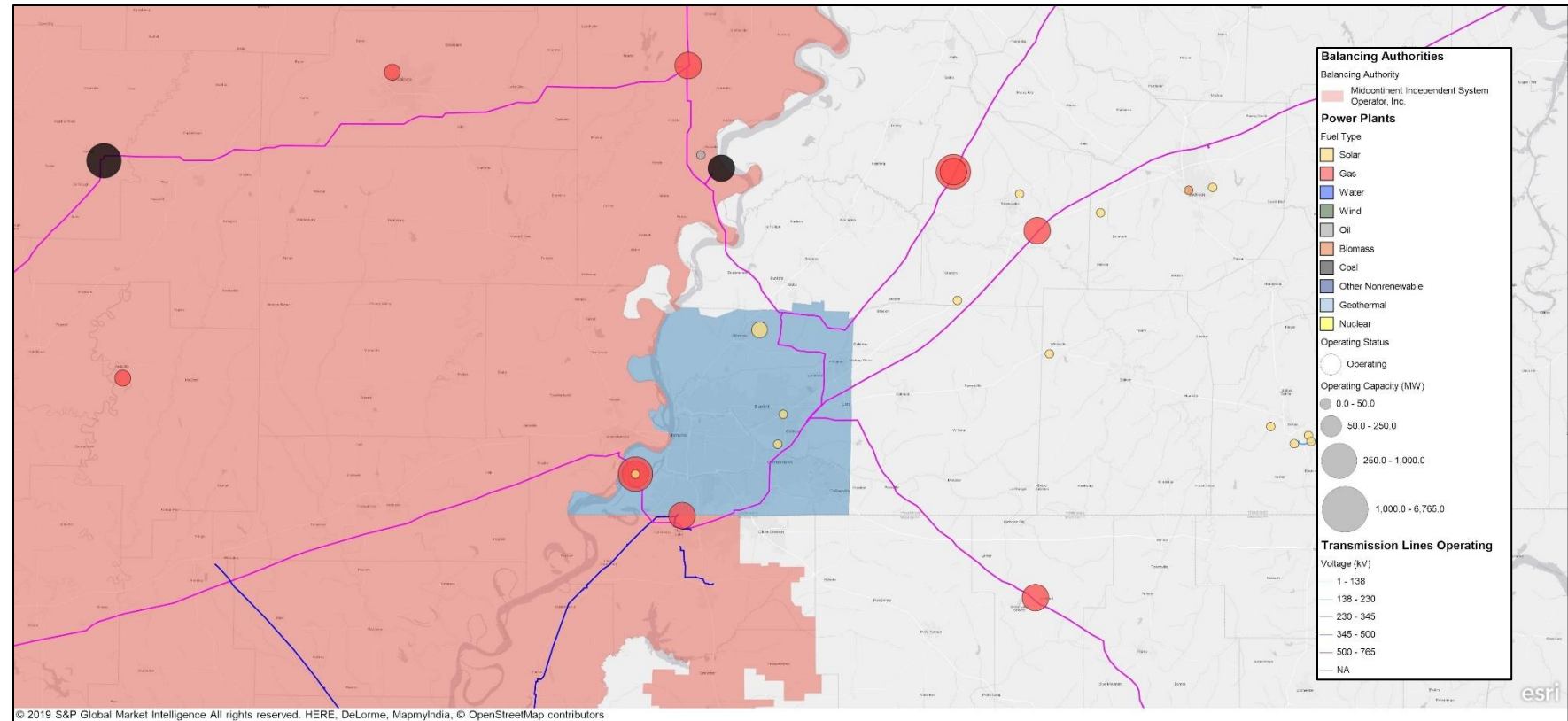
REQUIRED INFORMATION

- ❑ EPC / project capital cost
- ❑ Summer rated capacity
- ❑ Fixed O&M cost
- ❑ Variable O&M cost
- ❑ Heat rate curve
- ❑ Fuel cost & transportation
- ❑ Decommissioning cost
- ❑ Financing term
- ❑ Emission rates
- ❑ Inflation / escalation rates
- ❑ Discount rates
- ❑ Levelized fixed charge rate
- ❑ Availability / FO Rate
- ❑ Ancillary services

IRP MODELING

□ Transmission / Market Modeling via:

- PROMOD IV
- MarketPower
- PSS/E
- Crystal Ball



LONG-TERM POWER SUPPLY PLANNING GOALS

❑ Resource Diversity

- Economic Feasibility
- Portfolio “Fit”
- Congestion Risk

❑ Contract Term Diversity

- Start/end points
- Layering approach

❑ Fuel Diversity

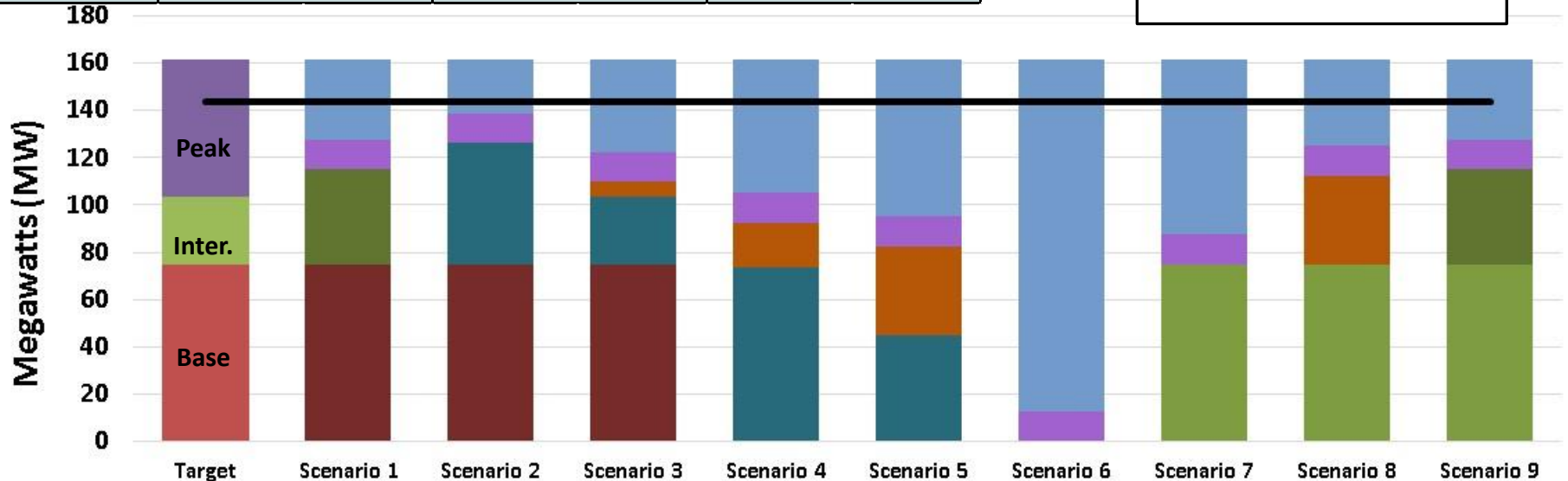
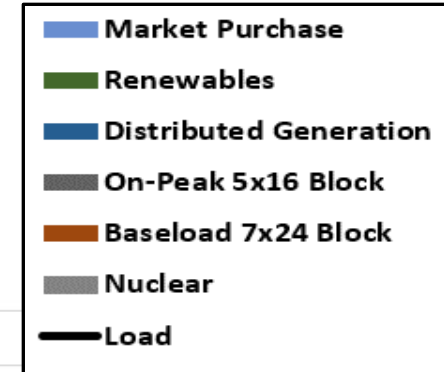
- Source differentiation
- Hedge to fuel prices
- Environmental regulation

❑ Renewable Diversity

- RPS Goals
- Consumer interest

SAMPLE IRP RESULTS #1

IRP Summary Results	Base Fuel		High Fuel		Political Fuel	
	NPV (\$Millions)	Rate (\$/MWh)	NPV (\$Millions)	Rate (\$/MWh)	NPV (\$Millions)	Rate (\$/MWh)
1. Business As Usal (BAU)	\$455.7	\$34.83	\$596.3	\$50.50	\$591.3	\$49.31
2. Scenario 1 - Block PPAs	\$657.2	\$50.23	\$753.8	\$63.84	\$727.0	\$60.63
3. Scenario 2 - RICE / LM2500, Block PPA	\$686.4	\$52.46	\$771.4	\$65.33	\$769.8	\$64.20
4. Scenario 3 - LM2500, Block PPA, Wind	\$381.4	\$29.16	\$503.7	\$42.66	\$618.3	\$51.57
5. Scenario 4 - LM2500, Block PPA, Solar	\$458.1	\$35.01	\$578.7	\$49.01	\$672.2	\$56.06
6. Scenario 5 - LM6000, Wind PPA	\$414.3	\$31.67	\$615.3	\$52.11	\$609.7	\$50.84
7. Scenario 6 - RICE, Wind PPA	\$369.7	\$28.26	\$547.0	\$46.33	\$693.0	\$57.79
8. Scenario 7 - RTO Market	\$539.6	\$41.24	\$559.4	\$47.37	\$620.2	\$51.72
9. Scenario 8 - Modular Nuclear	\$473.8	\$36.22	\$551.1	\$46.67	\$543.5	\$45.33
10. Scenario 9 - Modular Nuclear, Wind	\$443.7	\$33.91	\$541.6	\$45.87	\$559.8	\$46.69
11. Scenario 10 - Modular Nuclear, Block PPA	\$614.8	\$46.99	\$693.3	\$58.72	\$695.7	\$58.02



SAMPLE IRP RESULTS #2

FEASIBILITY EVALUATION SUMMARY 3.29% FINANCING RATE

\$3 Gas Price Scenario		Capital Invest	20yr NPV	20yr NPV	30yr NPV	30yr NPV
	MW/ ¹	\$M	\$M	Mills	\$M	Mills
1. Self Build Alt. 1 + Self Build Alt. 5	405.0	\$225.0	\$905	63.2	\$955	66.9
2. Supplier 20yr Full Req. (1/1/2025)	400.0	\$0.0	\$915	69.4	\$945	75.5
3. Supplier 30Yr Full Req. (7/1/2025)	400.0	\$0.0	-	-	\$950	77.8
4. Supplier 20Yr PPA + Self Build Alt. 3	403.5	\$175.0	\$925	72.1	\$945	69.1

\$6 Gas Price Scenario		Capital Invest	20yr NPV	20yr NPV	30yr NPV	30yr NPV
	MW/ ¹	\$M	\$M	Mills	\$M	Mills
1. Self Build Alt. 1 + Self Build Alt. 5	405.0	\$225.0	\$985	82.8	\$995	86.4
2. Supplier 20yr Full Req. (1/1/2025)	400.0	\$0.0	\$965	87.9	\$1,025	95.1
3. Supplier 30Yr Full Req. (7/1/2025)	400.0	\$0.0	-	-	\$1,035	95.3
4. Supplier 20Yr PPA + Self Build Alt. 3	403.5	\$175.0	\$975	83.7	\$985	87.6



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